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DOCTOR DRONE USING GPS.

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Abstract: The combination of Raspberry Pi and APM in the field of drone technology offers a versatile and powerful platform for developing advanced applications such as GPS tracking and mission planning. This report explores the capabilities of Raspberry Pi and APM, their integration, and the programming aspects involved in developing a GPS tracking system for drones. The potential applicationsof this technology, benefits, and challenges are highlighted, along with an overview of existing research and projects.

In this project, we have developed a drone equipped with GPS tracking and mission planning capabilities using Raspberry Pi and Pixhawk. The drone is capable of autonomously flying over a designated area and providing basic medical assistance to the emergency situation specifically on those areas that are difficult to reach for the common vehicles and also when emergency vehicles are stuck in traffic, which can be used to optimize various applications. We have also developed a mission planning software that allows users to easily plan and execute missions for the drone.

Index Terms – flight controller, Pixhawk, APM, Raspberry Pi .

I. INTRODUCTION

The integration of GPS tracking and mission planning capabilities in drones has revolutionized the way we approach various applications, ranging from precision agriculture to environmental monitoring and surveillance. The use of open- source hardware and software such as Raspberry Pi and Pixhawk has made it easier and more affordable for researchers and enthusiasts to develop and implement these technologies. This project focuses on the implementation of GPS tracking and mission planning using Raspberry Pi and Pixhawk for drones.

In this project, we have developed a drone equipped with GPS tracking and mission planning capabilities using Raspberry Pi and Pixhawk. The drone is capable of autonomously flying over a designated area and providing basic medical assistance to the emergency situation specifically on those areas that are difficult to reach for the common vehicles and also when emergency vehicles are stuck in traffic, which can be used to optimize various applications. We have also developed a mission planning software that allows users to easily plan and execute missions for the drone.

The main objectives of this project are to develop a low-cost and efficient solution for GPS tracking and mission planning using Raspberry Pi and Pixhawk for drones, to provide a platform for researchers and enthusiasts to develop and test various applications, and to demonstrate the potential impact of this technology in a variety of fields.

Through this project, we aim to contribute to the growing body of research on the use of drones for various applications, and to promote the use of open-source hardware and software for the development of innovative solutions.

II. LITERATURE SURVEY

Paper 1 of "Design and Implementation of a GPS-Based Autonomous Drone" by M. Saeed, Tariq, and A. Anpalagan presents the design and implementation of a GPS-based autonomous drone using Raspberry Pi and Pixhawk, focusing on the integration of GPS for navigation and mission planning.

Paper 2 of "Real-time UAV Navigation and Collision Avoidance System using Raspberry Pi and Pixhawk" by A. Iqbal, M. R. Hafiz, and S. M. Ali. Discusses the development of a real- time navigation and collision avoidance system for UAVs using Raspberry Pi and Pixhawk, with emphasis on GPS-based tracking and mission planning.

Paper 3 of "A Survey on UAV Autopilot Systems" by K. Roy, M. Saha, and A. Pal. This survey paper provides an overview of autopilot systems for UAVs, including GPS-based navigation and mission planning. It discusses various platforms, including Raspberry Pi and Pixhawk, and their capabilities in terms of GPS integration.

Paper 4 of "Enhanced Precision Agriculture using UAVs and IoT" by S. S. Ramya, S. Sivagami, and P. Dhavachelvan. This paper explores the application of UAVs with GPS tracking and mission planning in precision agriculture, highlighting the use of Raspberry Pi and Pixhawk for data acquisition and analysis.

Paper 5 of "Design and Development of a Low-cost Autonomous Quadrotor for Surveillance Applications" by S. Ahmed, M. S. Ahmed, and M. U. Ahmed. This paper presents the design and development of a low-cost autonomous quadrotor for surveillance purposes, incorporating GPS tracking and mission planning using RaspberryPi and Pixhawk.

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These papers provide valuable insights into the development, implementation, and applications of GPS tracking and mission planning using Raspberry Pi and Pixhawk for drones. They cover various aspects such as system design, integration of GPS, navigation algorithms, and specific application domains. Exploring these papers will give you a comprehensive understanding of the existing research and advancements in this field.

III. IMPLEMENTATION

The methodology to implement project is described as below.

1. Hardware Implementation
2. Software Implementation

1. Hardware Implementation:

- Firstly we connect all the hardware components to each other.
- Frame of the drone which holds all the components together it sis of 1500 mm. the circuit board of the drone isused to connect all the ESC that is soldered to the circuit board.
- Brushless DC motors which are of 1800 kv and produces a thrust of 600 grams.
- ESC or electronic speed controller are used to control the rotation of DC motors which are of 30A.
- APM also called Aurdopilot mega is a flight controller which controls the ESC and also a GPS module isconnected to the GPS module

port.

- Raspberry pi module 4 which is used to program the drone for autonomous flight control.
- Propellers connected to the DC motors which are of 9inch and 4.7 pitch angle for the lifting of drone and thepropellers are connected clockwise and anticlockwise.

. Software Implementation:Include libraries.

- Define constants and variables.
- Pin assignments.
- Set up the Raspberry Pi
- Run the code in the Raspberry Pi .
- Initialize Sensors.
- Radio calibration in mission planner .
- Caliberate every other things in mission planner connected to APM.
- Run the code in the Raspberry Pi .
- The drone takes off and reaches the destination to provide basic first AID.

Firstly the GPS of the area to be reached for the drone is detected by the GPS module and the signals are sent to the Raspberry Pi through APM board and through the GPS tracking programming in the Raspberry Pi which is given in detail in the upcoming report , the drone takes off once the raspberry pi sends commands to the APM board it reaches the destination of the given location lands down and provides the medical kit to the emergency situation and comes back to the base station of the drone.

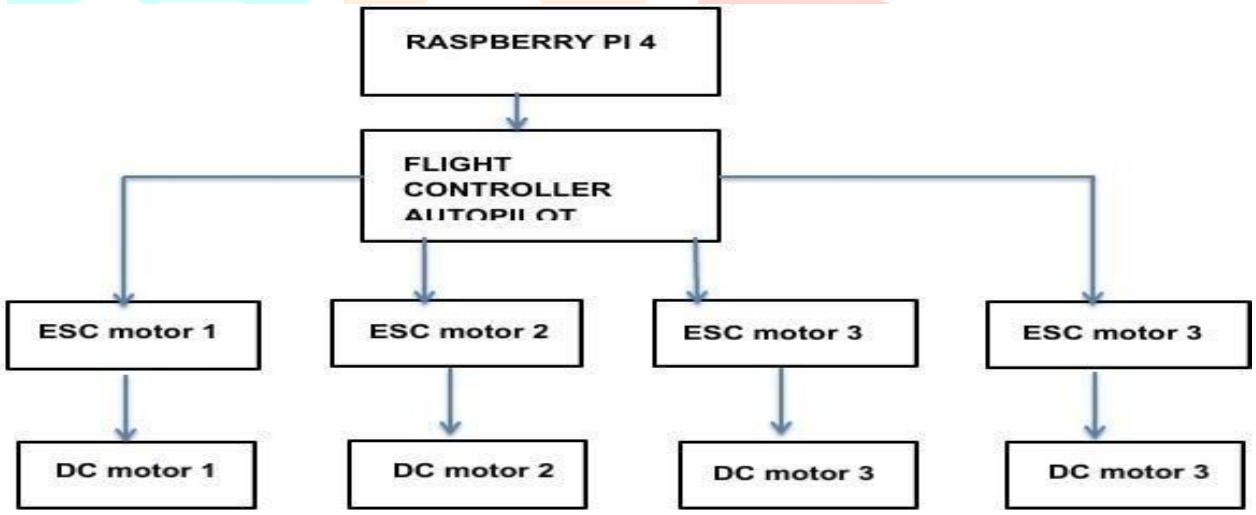

Fig.5.1: Block Diagram

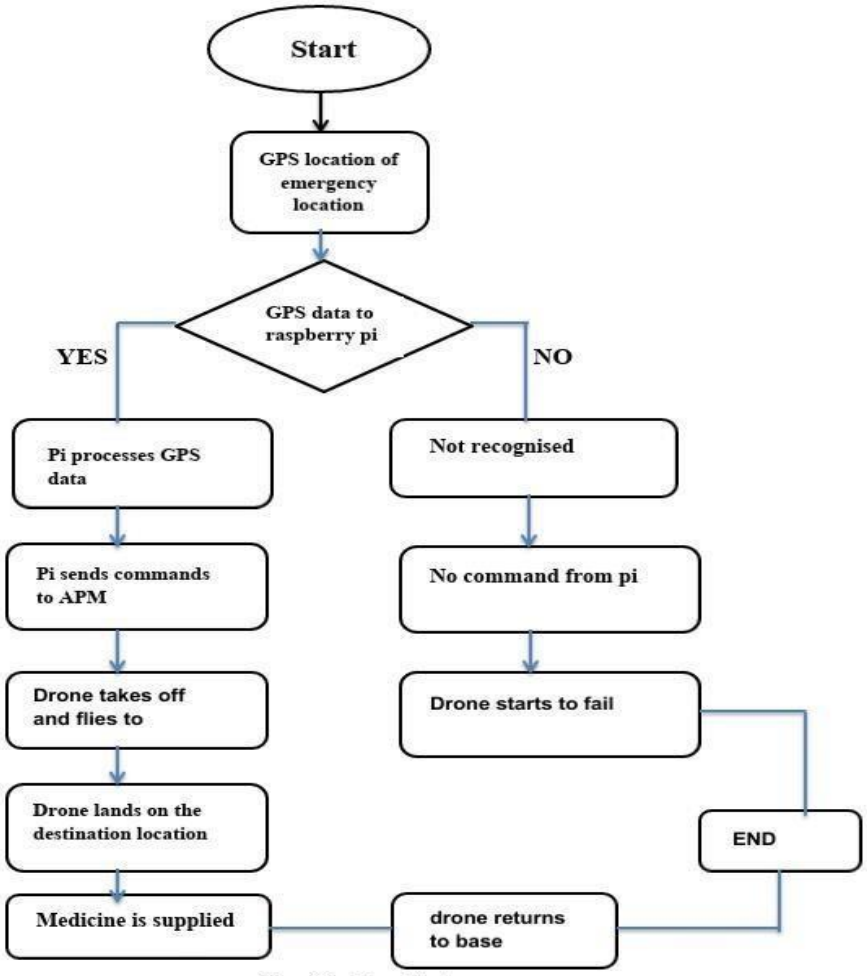

Fig. 5.2: Flow Chart.

IV. CONCLUSION AND FUTURE SCOPE

In addition to the potential applications of GPS tracking and mission planning using Raspberry Pi and Pixhawk for drones, there are several other factors that are driving the development of this technology. One of the key drivers is the increasing demand for automation and data-driven decision-making across a wide range of industries. By using drones with GPS tracking and mission planning capabilities, companies can collect and analyze data more efficiently and accurately thanever before.

Another important factor driving the development of this technology is the increasing availability and affordability of drones and related technologies. As the cost of drones and associated components continues to decrease, more organizationsare able to implement this technology, further fueling its growth and development.

Despite the potential benefits of GPS tracking and mission planning using Raspberry Pi and Pixhawk for drones, thereare also several challenges that must be addressed. These include regulatory and legal issues related to drone use, cybersecurity concerns, and the need for ongoing maintenance and upgrades to ensure the reliability and accuracy of the technology.

Overall, GPS tracking and mission planning using Raspberry Pi and Pixhawk for drones is a promising area of researchwith significant potential for practical applications and impact. With ongoing development and refinement, this technology has the potential to transform a wide range of industries and improve the way we collect, analyze, and use data.

V. REFERENCES

[1] "Integration of Raspberry Pi with Pixhawk for Quadrotor Control" by H. A. Rahman, M. H. Hasan and M. A. Hasan.This

paper describes the integration of Raspberry Pi with Pixhawk for controlling a quadrotor, including GPS-based navigation and mission planning.

[2] "Design and Development of an Autonomous Quadrotor Using Pixhawk and Raspberry Pi for Agricultural Applications"by S. S. Kanawade et al. This paper discusses the design and development of a quadrotor for agricultural applications using Pixhawk and Raspberry Pi, including GPS-based navigation, data acquisition, and image processing.

[3] "Low-Cost Raspberry Pi and Pixhawk-Based Quadcopter for Agricultural Remote Sensing" by J. A. Cerrudo et al. This paper presents the design and implementation of a low-cost quadcopter for agricultural remote sensingusing Raspberry Pi and Pixhawk, including GPS tracking and mission planning.

[4] "Autonomous Flight Control and Mission Planning for Quadrotors using Raspberry Pi and Pixhawk" by Y. K. Bang and K. Kim. This paper describes the implementation of autonomous flight control and mission planning for quadrotors using Raspberry Pi and Pixhawk, including GPS-based navigation and obstacle avoidance.

[5] "Development of an Autonomous Flight Control System for a Quadrotor using Raspberry Pi and Pixhawk" by M. R. Kim et al. This paper presents the development of an autonomous flight control system for a quadrotor using Raspberry Pi and Pixhawk, including GPS-based navigation, data acquisition, and real-time image processing..